

## CLAIMS

### What is claimed is:

1. An apparatus for routing interconnections among bond pads on a semiconductor die, comprising:  
a sheet-like, non-conductive structure having a first surface, and a second surface for attachment to a die; and  
a plurality of electrically conductive discrete pads attached to said first surface, the plurality of electrically conductive discrete pads electrically isolated from the second surface.

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2. The apparatus of claim 1, further comprising at least one conductor extending between at least two of said plurality of electrically conductive discrete pads.

3. The apparatus of claim 1, further comprising at least one conductor extending from at least one bond pad of said die to at least one of said plurality of electrically conductive discrete pads.

4. The apparatus of claim 1, wherein said non-conductive structure is comprised of a dielectric film or sheet.

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5. A method of routing external interconnections among a plurality of bond pads on an active surface of at least one semiconductor die, comprising:  
providing at least one electrically conductive discrete pad on said active surface of said at least one semiconductor die in electrical isolation from said active surface; and  
wire bonding from one of said plurality of bond pads to said at least one electrically conductive discrete pad.

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6. The method of claim 5, further comprising wire bonding from said at least one electrically conductive discrete pad to another of said plurality of bond pads.

7. The method of claim 5, further comprising wire bonding from said at least one electrically conductive discrete pad to another electrically conductive discrete pad.

5 8. The method of claim 5, wherein providing said at least one electrically conductive discrete pad is provided by performing at least one of the group comprising silk screening, printing, spraying, electrochemically depositing, masking and etching, electroplating, electrolessly plating, and adhesively attaching.

10 9. The method of claim 5, further comprising:  
attaching said at least one electrically conductive discrete pad to an insulating material;  
and attaching said insulating material to said die active surface.

15 10. The method of claim 9, further comprising selecting said insulating material from the group comprising thermosetting tape and adhesive tape.

11. The method of claim 5, further comprising selecting a material comprising said at least one electrically conductive discrete pad from the group comprising metals, alloys, and conductive epoxies.

20 12. The method of claim 5, further comprising:  
providing a lead frame; and  
attaching said at least one semiconductor die to said lead frame, said lead frame including:  
a plurality of lead fingers proximate said at least one semiconductor die.

25 13. The method of claim 12, further comprising wire bonding from said at least one electrically conductive discrete pad to one of said plurality of lead fingers.

14. The method of claim 12, further comprising:

providing said lead frame with at least one bus bar, said bus bar extending over at least a portion of said active surface of said at least one semiconductor die; and wire bonding from said at least one electrically conductive discrete pad to said at least one bus bar.

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15. A semiconductor device, comprising:

a die including a plurality of bond pads disposed on a surface thereof; an adapter having a first plurality of discrete electrical contacts on a first surface thereof, each electrically connected to one of said plurality of bond pads and said adapter having a second plurality of discrete electrical contacts on a second surface thereof, at least some of said second plurality of discrete electrical contacts in electrical communication with said first plurality of discrete electrical contacts; and a plurality of conductive bumps, each extending from one of said second plurality of discrete electrical contacts.

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16. The semiconductor device of claim 15, further comprising a protective coating over at least a portion of said die and with said plurality of conductive bumps being at least partially exposed.

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17. A semiconductor device, comprising:

a die including a plurality of bond pads disposed on a first surface thereof; an adapter having a first plurality of discrete electrical contacts on a first surface thereof, each electrically connected to one of said plurality of bond pads, and a second plurality of discrete electrical contacts on a second surface thereof, at least some of said second plurality of discrete electrical contacts being horizontally remote from at least some of the bond pads disposed on the first surface of the die, the at least some of said second plurality of discrete electrical contacts being electrically

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connected to said first plurality of discrete electrical contacts horizontally offset therefrom through conductors carried by said adapter.

18. The semiconductor device of claim 15, wherein the adapter comprises a  
5 material having a coefficient of thermal expansion substantially matching a coefficient of thermal expansion of said die.

19. The semiconductor device of claim 15, wherein the adapter comprises at least  
10 one conductive via extending between at least one of the first plurality of discrete electrical contacts and at least one of the second plurality of discrete electrical contacts.

20. The semiconductor device of claim 19, wherein at least some of the second  
15 plurality of discrete electrical contacts are electrically isolated from the bond pads disposed on the surface of the die.

21. The semiconductor device of claim 15, wherein the adapter is adhesively  
20 secured to the die.

22. The semiconductor device of claim 17, wherein the adapter is adhesively  
25 secured to the die.

23. The semiconductor device of claim 17, wherein at least one of the conductors carried by the adapter are ~~internal~~ to the adaptor.

24. The semiconductor device of claim 17, wherein the adapter comprises a tape-like structure.

25. The semiconductor device of claim 17, wherein at least one of the second plurality of discrete electrical contacts is electrically interconnected with a second die.